

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 05 June 2001 (05.06.01)	Applicant's or agent's file reference P101459/JKH
International application No. PCT/GB00/03528	Priority date (day/month/year) 13 September 1999 (13.09.99)
International filing date (day/month/year) 13 September 2000 (13.09.00)	
Applicant KENINGTON, Peter et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

30 March 2001 (30.03.01)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Olivia TEFY Telephone No.: (41-22) 338.83.38
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REC'D 18 DEC 2001

WIPO

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

12

Applicant's or agent's file reference P101459/JKH	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/03528	International filing date (day/month/year) 13/09/2000	Priority date (day/month/year) 13/09/1999
International Patent Classification (IPC) or national classification and IPC H03F1/32		
Applicant WIRELESS SYSTEMS INTERNATIONAL LIMITED		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 7 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 9 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 30/03/2001	Date of completion of this report 14.12.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Dietsche, S Telephone No. +49 89 2399 7465 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/03528

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17):*)

Description, pages:

3-12	as published		
1,2	as received on	02/11/2001	with letter of 29/10/2001

Claims, No.:

1-50	as received on	02/11/2001	with letter of 29/10/2001
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Drawings, sheets:

1/11-11/11	as published
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/03528

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.
- ☒ claims Nos. 6, 7, 25, 31, 32, 50.

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 6, 7, 25, 31, 32, 50 are so unclear that no meaningful opinion could be formed (*specify*):
see separate sheet
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

- ☐ the written form has not been furnished or does not comply with the standard.
- ☐ the computer readable form has not been furnished or does not comply with the standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/03528

1. Statement

Novelty (N)	Yes:	Claims	5, 11-16, 18, 21-23, 30, 36-41, 43, 46-48
	No:	Claims	1-4, 8-10, 17, 19, 20, 24, 26-29, 33-35, 42, 44, 45, 49
Inventive step (IS)	Yes:	Claims	5, 11-16, 18, 21-23, 30, 36-41, 43, 46-48
	No:	Claims	1-4, 8-10, 17, 19, 20, 24, 26-29, 33-35, 42, 44, 45, 49
Industrial applicability (IA)	Yes:	Claims	1-5, 8-24, 26-30, 33-49
	No:	Claims	none

2. Citations and explanations see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

- 1. The following document will be referred to in this international preliminary examination report:**

D1 = WO99/45638

- 2. With reference to item III**, the examiner is at present not in the position to give a meaningful opinion with regard to novelty, inventive step and industrial applicability concerning the subject-matter of the claims 6, 7, 25, 31, 32 and 50 due to serious clarity objections under Art. 6 PCT.

- 2.1 The subject-matter of the claims 6, 7, 31 and 32 is totally unclear with respect to the intended technical meaning of the claimed distortion components which are "susceptible of independent control".

Due to this substantial lack of clarity, the subject-matter of the claims 6, 7, 31 and 32 was no longer considered during the following examination.

- 2.2 The subject-matter of the claims 25 and 50 does not meet the requirements of Rule 6.2 (a) PCT, since it refers to the drawings (cf. PCT-Gazette, Section IV, III-4.10). Consequently, the subject-matter of these two claims was no longer considered during the following examination.

- 3. With reference to item V**, the examiner is of the opinion that the present application does not meet the requirements of Art. 33 (2) and (3) PCT.

- 3.1 In consideration of the wording used in claim 1, document D1 discloses in the description (page 1, line 1 to page 18, line 4) and in the drawings (fig. 1-4) a lineariser (fig. 1: 205, 220, 230, 235, 240, 245, 250) for reducing distortion of the output signal (fig. 1: RF Output) which a signal handling means (fig. 1: 100) produces in response to an input signal (fig. 1: RF input), the lineariser comprising
- means (fig. 1: 205) for extracting a portion of the input signal,
 - means (fig. 1: 230) for modifying the extracted signal to create non-linear components of reduced frequency therein,
 - means (fig. 1: 230 in combination with fig. 2 and 4; cf. page 7, lines 2-8) for generating digitally a distortion signal (fig. 2: third order component 'RF

- Output') from a delivered signal which is the modified signal and means (fig. 1: 220) for combining the distortion signal with the input signal.

Thus, document D1 discloses all the features claimed in claim 1 which is, therefore, not new in the sense of Art. 33 (2) PCT.

With respect to the claimed "means for generating digitally a distortion signal from a delivered signal which is the modified signal", it should be noted that in the circuit disclosed in D1 a part of the RF input signal is extracted by coupler 205 and coupled to a means 230 which, as shown in fig. 2, modifies (e.g. squares) this extracted input signal to obtain e.g. a first modified signal (output of 410). This means 230 includes furthermore an 'automatic control mechanism' 445 comprising a DSP (cf. fig. 4). Based on the extracted input signal 'RF Input' and the third order distortion output signal 'RF Output', the DSP generates digitally a control signal 'DC level' that is used for generating the third order distortion output signal (fig. 2: 435).

- 3.2 In consideration of the wording used in claim 1, document D1 discloses in the description (page 1, line 1 to page 18, line 4) and in the drawings (fig. 1-4) a lineariser (fig. 1: 205, 220, 230, 235, 240, 245, 250) for reducing distortion of the output signal (fig. 1: RF Output) which a signal handling means (fig. 1: 100) produces in response to an analogue RF input signal (fig. 1: RF input), the lineariser comprising
- means (fig. 1: 205) for extracting a portion of the input signal,
 - means (fig. 1: 230 in combination with fig. 2 and 4; cf. page 7, lines 2-8) for generating digitally a distortion signal (fig. 2: third order component 'RF Output') from a delivered signal which is the extracted signal and
 - means (fig. 1: 220) for mixing the distortion signal into the input signal.

Thus, document D1 discloses all the features claimed in claim 4 which is, therefore, not new in the sense of Art. 33 (2) PCT.

- 3.3 Since the subject-matter of the independent apparatus claim 1 is not novel, the subject-matter of the corresponding independent method claim 26 is not new in the sense of Art. 33 (2) PCT either (cf. point 3.1).

- 3.4 Since the subject-matter of the independent apparatus claim 4 is not novel, the subject-matter of the corresponding independent method claim 29 is not new in the sense of Art. 33 (2) PCT either (cf. point 3.2).
- 3.5 With respect to the dependent claims 2, 3, 8-10, 17, 19, 20, 24, 27, 28, 33-35, 42, 44, 45 and 49, it should be noted that these claims appear not to meet the requirements of Art. 33 (2) and (3) PCT either, since their subject-matter is either known from or rendered obvious by the available prior art. With respect to the remaining claims 5, 11-16, 18, 21-23, 30, 36-41, 43 and 46-48, it should be noted that these claims appear to meet the requirements of Art. 33 (2) and (3) PCT but to fail the requirements of Rule 13.1 PCT, since their subject-matter is not linked by a single inventive concept.
4. **With respect to item VII**, the present application contains the following defects:
- 4.1 Contrary to the requirements of Rule 6.3 b) PCT, the independent claims 1, 4, 26 and 29 are not drafted in the two-part form, with those features being known from the closest prior art document (D1) being placed in the preamble of the claim, and new features being placed in the characterising portion of the claim.
- 4.2 Contrary to the requirements of Rule 6.2 b) PCT, the present set of claims does not contain reference signs to increase the intelligibility of the claims.

REPLACED BY
ART 34 AMBT
WO 01/20775

PTO/PCT Rec'd 13 MAR 2002
10/088424
PCT/GB00/03528

A LINEARISER FOR A SIGNAL HANDLING APPARATUS

This application relates to methods and apparatus for signal processing, in particular methods and apparatus for linearising, or reducing distortion appearing in, the output signal which a signal handling means produces in response to an input signal.

Predistortion schemes for reducing distortion appearing in the output of a non-linear amplifier are known. A synthesised distortion signal is added into the input to the amplifier. The distortion signal is arranged so that its addition tends to cancel any distortion imposed on the input signal by the amplifier during amplification.

According to a first aspect, the present invention provides a lineariser for reducing distortion of the output signal which a signal handling means produces in response to an input signal, the lineariser comprising means for extracting a portion of the input signal, means for modifying the extracted signal to create non-linear components of reduced frequency therein, means for generating digitally a distortion signal from the modified signal and means for combining the distortion signal with the input signal.

The invention may thus provide a flexible distortion reduction system which is capable of implementing relatively complex forms of distortion correction. The generation of reduced frequency components in the extracted portion of the input signal facilitates the use of digital signal processing in the generation and adaptation of the distortion signal for combination with the input signal to achieve the best possible distortion reduction therein. Since the lineariser according to the invention does not rely on local oscillator signals or any other form of reference from the host system of which it is a part, it can be implemented as a stand alone subsystem. This can be a significant benefit in many applications. It could even be located remotely from the rest of the system (e.g. a cellular radio base station).

According to a second aspect, the invention provides a lineariser for reducing distortion of the output signal which a signal handling means produces in response to an input signal, the lineariser comprising means for extracting a portion of the input signal, means for generating digitally a distortion signal from the extracted signal and means for mixing the distortion signal into the input signal.

The invention also provides a method of reducing distortion of the output signal which a signal handling means produces in response to an input signal, the method comprising extracting a portion of the input signal, modifying the extracted signal to create non-linear components of reduced frequency therein, generating digitally a distortion signal from the modified signal and combining the distortion signal with the input signal.

Furthermore, the invention also provides a method of reducing distortion of the output signal which a signal handling means produces in response to an input signal, the method comprising extracting a portion of the input signal, generating digitally a distortion signal from the extracted signal and mixing the distortion signal into the input signal.

By way of example only, certain embodiments of the invention will now be described with reference to the accompanying figures, in which:

Figure 1 is a schematic diagram of a lineariser circuit;

Figure 2 is a schematic diagram of another lineariser circuit;

Figure 3 is a schematic diagram of a further lineariser circuit;

Figure 4 is a schematic diagram of a yet further lineariser circuit;

Figure 5 is a schematic diagram of another lineariser circuit;

Figure 6 is a schematic diagram of yet another lineariser circuit;

Figure 7 is a schematic diagram of a control scheme for a lineariser;

Claims

1. A lineariser for reducing distortion of the output signal which a signal handling means produces in response to an input signal, the lineariser comprising means for extracting a portion of the input signal, means for modifying the extracted signal to create non-linear components of reduced frequency therein, means for generating digitally a distortion signal from the modified signal and means for combining the distortion signal with the input signal.
2. A lineariser according to claim 1, wherein the modifying means comprises means for squaring the extracted signal.
3. A lineariser according to claims 1 or 2, wherein the combining means comprises means for mixing the distortion signal into the input signal.
4. A lineariser for reducing distortion of the output signal which a signal handling means produces in response to an input signal, the lineariser comprising means for extracting a portion of the input signal, means for generating digitally a distortion signal from the extracted signal and means for mixing the distortion signal into the input signal.
5. A lineariser according to any preceding claim, wherein the distortion generating means comprises storage means, wherein the storage means is addressed by values of the signal used to generate the distortion to responsively output corresponding values for the distortion signal.
6. A lineariser according to any preceding claim, wherein the distortion generating means comprises means for generating a number of distortion components which are susceptible of independent control.

7. A lineariser according to claim 6, wherein the distortion generating means comprises means for splitting at least one distortion component into orthogonal components, each orthogonal component being susceptible of independent control.
8. A lineariser according to any preceding claim, wherein the distortion generating means comprises means for adding a dc signal into the distortion signal.
9. A lineariser according to any preceding claim, wherein the distortion generating means comprises means for multiplying the signal used to generate the distortion signal with itself repeatedly.
10. A lineariser according to claim 9, wherein the distortion generating means produces a number of components and further comprises means for removing lower order components appearing in at least one of the components.
11. A lineariser according to any one of claims 3 to 10, wherein the mixing means comprises means for splitting the input signal into orthogonal components.
12. A lineariser according to claim 11, wherein the mixing means mixes the distortion signal into one of the orthogonal input signal components.
13. A lineariser according to claims 11 or 12, wherein the mixing means mixes a dc component into one of the orthogonal input signal components.
14. A lineariser according to claim 11, wherein the distortion signal comprises two orthogonal components and the mixing means mixes each orthogonal signal component into a respective input signal component.
15. A lineariser according to any preceding claim, further comprising means for conditioning the signal input to the distortion generating means so that it maintains a substantially constant amplitude.

16. A lineariser according to any preceding claim, further comprising means for monitoring the amplitude of the extracted signal and determining whether to place the lineariser in an operative condition.
17. A lineariser according to any preceding claim, further comprising control means for adjusting a parameter of the distortion signal.
18. A lineariser according to claim 17, wherein the control means uses a feedback signal derived from the output signal to determine the adjustments to the distortion signal.
19. A lineariser according to claim 17 or 18, wherein the distortion signal comprises a number of components and the control means is capable of exerting independent control over at least one of them.
20. A lineariser according to any of claims 17 to 19, wherein the parameter adjusted by the control means is amplitude.
21. A lineariser according to any one of claims 17 to 20, wherein the control means generates at least one non-linear component of the signal input to the distortion generating means for correlation with the feedback signal to produce signals to control parameters of the distortion signal or components thereof.
22. A lineariser according to any one of claims 17 to 20, wherein the control means divides the signal input to the distortion generating means into components and correlates them with the feedback signal to produce signals to control parameters of the distortion signal or components thereof.
23. A lineariser according to any one of claims 17 to 20, wherein the control means divides the signal input to the distortion generating means into components and determines their amplitude in order to produce signals to control parameters of the distortion signal or components thereof.

24. A lineariser according to any preceding claim, wherein the signal handling means is amplifying means.
25. A lineariser substantially as hereinbefore described with reference to any of Figures 1 to 10.
26. A method of reducing distortion of the output signal which a signal handling means produces in response to an input signal, the method comprising extracting a portion of the input signal, modifying the extracted signal to create non-linear components of reduced frequency therein, generating digitally a distortion signal from the modified signal and combining the distortion signal with the input signal.
27. A method according to claim 26 wherein the modifying step comprises squaring the extracted signal.
28. A method according to claim 26 or 27, wherein the combining step comprises mixing the distortion signal into the input signal.
29. A method of reducing distortion of the output signal which a signal handling means produces in response to an input signal, the method comprising extracting a portion of the input signal, generating digitally a distortion signal from the extracted signal and mixing the distortion signal into the input signal.
30. A method according to any one of claims 26 to 29, wherein the distortion generating step comprises addressing a storage means by values of the signal used to generate the distortion to responsively output corresponding values for the distortion signal.
31. A method according to any one of claims 26 to 30, wherein the distortion generating step comprises generating a number of distortion components which are susceptible of independent control.

32. A method according to claim 31, wherein the distortion generating step comprises splitting at least one distortion component into orthogonal components, each orthogonal component being susceptible of independent control.
33. A method according to any one of claims 26 to 32, wherein the distortion generating step comprises adding a dc signal into the distortion signal.
34. A method according to any one of claims 26 to 33, wherein the distortion generating step comprises multiplying the signal used to generate the distortion signal with itself repeatedly.
35. A method according to claim 34, wherein the distortion generating step produces a number of components and further comprises removing lower order components appearing in at least one of the components.
36. A method according to any one of claims 28 to 35, wherein the mixing step comprises splitting the input signal into orthogonal components.
37. A method according to claim 36, wherein the mixing step comprises mixing the distortion signal into one of the orthogonal input signal components.
38. A method according to claim 36 or 37, wherein the mixing step comprises mixing a dc component into one of the orthogonal input signal components.
39. A method according to claim 36, wherein the distortion signal comprises two orthogonal components and the mixing step comprising mixing each orthogonal distortion signal component into a respective input signal component.
40. A method according to any one of claims 26 to 39, further comprising conditioning the signal used to generate the distortion signal in the distortion generating step so that it maintains a substantially constant amplitude.

41. A method according to any one of claims 26 to 40, further comprising monitoring the amplitude of the extracted signal and determining whether to subject the output signal to the distortion reduction method.
42. A method according to any one of claims 26 to 41, further comprising a control step of adjusting a parameter of the distortion signal.
43. A method according to claim 42 wherein the control step uses a feedback signal derived from the output signal to determine the adjustments to the distortion signal.
44. A method according to claim 42 or 43, wherein the distortion signal comprises a number of components and the control step comprises exerting independent control over at least one of them.
45. A method according to any one of claims 42 to 44, wherein the parameter adjusted by the control step is amplitude.
46. A method according to any of one of claims 42 to 45, wherein the control step comprises generating at least one non-linear component of the signal used to generate the distortion signal in the distortion generating step for correlation with the feedback signal to produce signals to control parameters of the distortion signal or components thereof.
47. A method according to any one of claims 42 to 45, wherein the control step divides the signal used to generate the distortion signal in the distortion generating step into components and correlates them with the feedback signal to produce signals to control parameters of the distortion signal or components thereof.
48. A method according to any one of claims 42 to 45, wherein the control step divides the signal used to generate the distortion signal in the distortion generating step into components and determines their amplitude in order to produce signal to control parameters of the distortion signal or components thereof.

49. A method according to claim 26 to 48, wherein the signal handling means is amplifying means.

50. A method substantially as hereinbefore described with reference to any one of Figures 1 to 10.

WO 01/20775 A1



patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *With international search report.*

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 00/03528

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H03F1/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H03F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 929 703 A (SEHIER PHILIPPE ET AL) 27 July 1999 (1999-07-27)	1-5, 11, 16-20, 24-30, 41-45, 49
Y	column 4, line 35 -column 6, line 26; figures 1, 6	6, 8, 9, 31, 33, 34 7, 10-15, 21-23, 32, 35-40, 46-48
A	US 4 331 928 A (HEIDT MARVIN W) 25 May 1982 (1982-05-25) abstract; figure 1	1-49

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

15 December 2000

Date of mailing of the international search report

22/12/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Segaert, P

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/03528

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 164 678 A (BOKSBERGER HANS ULRICH ET AL) 17 November 1992 (1992-11-17) column 6, line 23 -column 11, line 58; figures 1-3 ---	6,8,9, 31,33,34
A	FR 2 540 309 A (THOMSON CSF) 3 August 1984 (1984-08-03) ---	
A	EP 0 067 091 A (THOMSON CSF) 15 December 1982 (1982-12-15) ---	
A	EP 0 751 614 A (NOKIA MOBILE PHONES LTD) 2 January 1997 (1997-01-02) ---	
A	WO 99 45638 A (KENNINGTON PETER ;WIRELESS SYSTEMS INTERNATIONAL (GB)) 10 September 1999 (1999-09-10) ---	
A	WO 99 45640 A (KENNINGTON PETER ;WIRELESS SYSTEMS INTERNATIONAL (GB)) 10 September 1999 (1999-09-10) -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/03528

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5929703	A	27-07-1999	FR 2752313 A CA 2211613 A EP 0823805 A JP 10126165 A	13-02-1998 07-02-1998 11-02-1998 15-05-1998
US 4331928	A	25-05-1982	NONE	
US 5164678	A	17-11-1992	EP 0465709 A BR 9102948 A CA 2046457 A CN 1058122 A,B CS 9102104 A HU 60576 A JP 4233810 A PL 290991 A ZA 9105313 A	15-01-1992 11-02-1992 13-01-1992 22-01-1992 19-02-1992 28-09-1992 21-08-1992 10-08-1992 25-03-1992
FR 2540309	A	03-08-1984	NONE	
EP 0067091	A	15-12-1982	FR 2507026 A JP 57199305 A	03-12-1982 07-12-1982
EP 0751614	A	02-01-1997	FI 98014 B JP 9023119 A US 5786728 A	13-12-1996 21-01-1997 28-07-1998
WO 9945638	A	10-09-1999	AU 2737099 A GB 2335813 A,B	20-09-1999 29-09-1999
WO 9945640	A	10-09-1999	AU 2737399 A GB 2335812 A,B	20-09-1999 29-09-1999

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P101459/JKH	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 03528	International filing date (day/month/year) 13/09/2000	(Earliest) Priority Date (day/month/year) 13/09/1999
Applicant WIRELESS SYSTEMS INTERNATIONAL LIMITED		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

A LINEARISER FOR A SIGNAL HANDLING APPARATUS

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

T/GB 00/03528

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H03F1/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H03F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 929 703 A (SEHIER PHILIPPE ET AL) 27 July 1999 (1999-07-27)	1-5, 11, 16-20, 24-30, 41-45, 49
Y	column 4, line 35 -column 6, line 26; figures 1,6	6, 8, 9, 31, 33, 34
A		7, 10-15, 21-23, 32, 35-40, 46-48
A	US 4 331 928 A (HEIDT MARVIN W) 25 May 1982 (1982-05-25) abstract; figure 1	1-49



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

* & * document member of the same patent family

Date of the actual completion of the international search

15 December 2000

Date of mailing of the international search report

22/12/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Segaert, P

INTERNATIONAL SEARCH REPORT

International Application No

T/GB 00/03528

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 164 678 A (BOKSBERGER HANS ULRICH ET AL) 17 November 1992 (1992-11-17) column 6, line 23 -column 11, line 58; figures 1-3 ----	6,8,9, 31,33,34
A	FR 2 540 309 A (THOMSON CSF) 3 August 1984 (1984-08-03) ----	
A	EP 0 067 091 A (THOMSON CSF) 15 December 1982 (1982-12-15) ----	
A	EP 0 751 614 A (NOKIA MOBILE PHONES LTD) 2 January 1997 (1997-01-02) ----	
A	WO 99 45638 A (KENNINGTON PETER ;WIRELESS SYSTEMS INTERNATIONAL (GB)) 10 September 1999 (1999-09-10) ----	
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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WO 9945640	A	10-09-1999	AU 2737399 A GB 2335812 A, B	20-09-1999 29-09-1999